In applicant's Figure 5, the angled abutment 68 is attached to an implant fixture 50 having a solid threaded shaft 55. Greenberg's implant 60 has a deep blind threaded hole in the portion of implant installed within the bone 50. Fig. 20 of Greenberg best illustrates the inherent weakening of a minipin implant shaft within the bone. If the diameter of the implant 60 is approximately 2 mm in diameter and the attachment screw 88 is 1 mm in diameter, the resulting wall thinness, including the thinned portion caused by the internal and external threading process will result in the failure of the implant fixture during installation or use. Consequently, applicant's Figure 5 illustrates a minipin implant 50 and mating angled abutment 68 held in place by short mounting screw 66. Mounting screw 66 does not penetrate into the flared region 55 of the implant, but attaches within a blind threaded hole in the head of the implant. Moreover, Greenberg in Fig. 20 shows an separate wedge structure 130 that tilts his assembies102 and 106. Applicant's Figure 5 has an angle surface 53 that is of one piece with the implant fixture 50. This prevents any slipping under force of use. These are significant structural differences.

Since Greenberg is using a separate abutment 82 attached to the implant fixture 60, he requires a separate screw 88. His Figure 5 shows this mounting screw penetrating deep within the shaft of the implant 60. Greenberg's implant does not have an integral hemispherical head to form the lower half of a sphere like that of the applicant. This is a substantial structural difference.

Applicant reasons as follows. The narrow diameter of his implant shaft 5, being approximately 2 mm, will not mechanically allow for a deep, internal threaded hollow for

additional retaining hardware 88 like that of Greenberg. Any such internal, threaded hollow will compromise the necessary strength of the implant. Therefore, in his preferred embodiment illustrated in Figure 1, applicant allows only a short, integral threaded screw shaft 26 to mate with a shallow threaded blind hole 11. This threaded hole does not project into the neck 7 or the shaft 5 of implant 1, but remains solely within the confines of the hemispherical head 8 of the implant.

With the known manufacturing techniques and materials available to the applicant, a 2mm diameter threaded shaft with a 1 mm coaxial, threaded blind hole does not have the strength to support the forces of installation or use, while a solid 2mm externally threaded shaft will.

In the alternate embodiment of applicant as shown in his Figure 5, in order to accommodate an offset head 68, a short screw 66 is used. The threaded portion 63 of this screw does not extend into the neck portion 57 or shaft 55 of implant 50 for the same reason. The strength of the implant's threaded shaft will be irreparably weakened.

Referring to Figure 1, applicant, if he desires at a later date, replaces the upper hemispherical head 2 with a conical head 3 for mating with a semi-permanent cemented prosthesis. This is accomplished by removing the hemispherical ball head 2 using a suitable wrench in recess 14 and substituting a conical abutment 3 using a wrench within recess 19 to mate threaded screw shaft 26 with the threaded blind hole 11 in the implant 1, while the implant remains undisturbed within the bone.

This ability to substitute one type of head for another, at a later date, is the essence of the applicant's invention.

On the Examiner's rejection of claims 1-4, 6-7 and 11-12 under 35 USC 103 (a) over Daftary et al (USPN 5,145,372) in view of Gittleman (USPN 5,967,781).

Daftary '372 teaches a contoured "healing cap" to be used with a standard implant fixture. In his Fig. 1 and Fig 2 showing an implant fixture 12, the fixture is equipped with a "hollow portion 18 which extends from the upper surface 20 of the fixture toward the lower surface 22" (col 6 line 64). This portion of the fixture is buried in the jaw bone 26. This differs from the solid minipin shaft of current application. It is not obvious that Daftary is trying to solve the same set of problems and therefore does not look in the direction of a narrow solid shaft, minipin implant fixture. Daftary '372 has significant structural differences from this application.

Daftary '372 Fig. 10 teaches a separate abutment 304 with a " a stem 314 protruding from its smaller end." This stem, though only once mentioned here, appears to be the same stem 414 in Figs. 14 - 16. Daftary states, [This] "threaded stem 414 protruding from its smaller end. The threaded stem can be threaded into the hollow of the dental implant fixture in the same manner as other healing caps described earlier." Thus, this stem enters the hollow threaded blind hole in the portion of the implant fixture within the jaw bone and is not an integral part of a solid minipin implant. Applicant has a single, structurally

strong piece, while Daftary '372 uses multiple pieces that compromise that physical strength. These are significant structural differences.

Gittleman '781 teaches a dental abutment with interchangeable risers to provide a gap between the abutment and the prosthesis for use by a prying tool. His drawings Figures 15 and 16 show a standard fixture 1 with a threaded blind hole 25 to accommodate the abutment threaded shaft 23. The implant fixture is show as a standard width, straight cylinder buried within bone and without a flared distal region. Gittleman '781 neither specifies nor claims a narrow, solid shaft, minipin implant fixture with an integral, hemispherical distal portion. The problems Gittleman '781 sought to solve did not direct his thoughts toward the current application. Applicant has, as a single, structurally strong piece, while Gittleman '781 uses multiple pieces that compromise that physical strength. There are significant structural differences between Gittleman '781 and the current application.

Daftary '372 displays in his Fig. 18 and Fig. 15 a two part healing cap. Domed region 408 is not a hemisphere (half-sphere). Since applicant, in his preferred embodiment, forms a ball head to snap into a prosthesis underlining, he teaches a hemisphere of one piece with the shaft of the minipin implant and a mating hemisphere abutment to form a complete sphere or ball head. Daftary '372 teaches a healing cap to form the desired gingival shape during healing. He does not teach an apparatus for immediately securing a denture. His combined elements do not form a sphere, which is ideal to that purpose. Additionally, his frusto-conic elements 304 in his Fig. 11 thread into the separate abutment 306 which, in

turn threads into an implant fixture 12 (Fig.1 and Fig.2) by means of threaded screw shaft 314. Applicant combines these elements as a single continuous piece for economy and necessary mechanical strength. This is a required significant structural difference over Daftary '372.

Both Daftary('372) and Gittleman ('781) have significant structural differences from this application, and did not seek to solve the problems addressed in this application. Since they did not incidentally or actually teach a solution to matters taught in this application, it would not be obvious to one skilled in the art.

On the Examiner's rejection of Claims 5 and 13-47:

Both Daftary '373 and Niznick (USPN 6,2887, 117) do not teach a solid minipin implant. All of the Niznick implant fixtures have a blind threaded hole within the distal portion of the implant fixture extending within the bone. (Niznick '117 uses the term shaft, as in elevator- or mine- shaft, for this blind threaded hole. Applicant uses the term shaft to mean a cylindrical shaped solid projection.) This deep blind threaded hole is a substantial structural difference from this application, in that a narrow minipin fixture cannot maintain structural strength with the central portion absent. A narrow diameter externally threaded implant with an internally threaded hole in the body of the shaft would appear in cross section like a bellows and flex and bend or break accordingly. Niznick '117 teaches this deep hollow recess within the body of the implant in the portion embedded within the bone. In some of his embodiments, he teaches a apical hole 17 and transverse hole 18 (Fig.

1). This is a distinct structural difference from this application. These referenced features would fatally weaken the apical region of a solid minipin implant fixture of the narrow diameter envisioned by applicant.

Since neither Daftary '372 nor Niznick '117 are attempting to solve the same problem as the applicant, they fail to teach, singly or in combination, the solid body minipin implant of narrow diameter, necessary to this application.

On the Examiner's rejection of Claims 8 and 9:

Klardie USPN 5,7872,918 provides several small grooves with sharp angular corners of a nearly rectangular cross section for cement retention, not a single larger semicircular groove for retaining a flexible 'o' ring. He does not mention the use of an 'o' ring or a ball head to facilitate the easy snapping on and off of a dental overcase. The sharp edges and small sizes of Klardie's circumferentially oriented grooves on a conic face will fail to hold an 'o' ring or would cut and damage the 'o' ring. This is a substantial physical difference from the applicant's design.

Klardie states,

" As shown in FIGS. 1, 2 and 4, the superior end of the abutment has a plurality of circumferentially oriented grooves and a beveled surface for use as a leverage bearing surface and for prosthetic alignment. The abutment 42 serves to connect the prosthesis to the implant 11 and the grooves facilitate cementation of the prosthesis to the implant as is well known in the art. The abutment also has a lower frusta-conical outer surface 43

terminating in a lower annular surface 44 which is formed for cooperative support on bearing surface 18."

Additionally, the above arguments offered in response to Daftary '372 fail to disclose the applicant's claims.

Since neither Daftary '372 nor Klardie '918 teach structures that would have the strength of the solid core minipin, it would not be obvious to one schooled in the art that in combination either will overcome the physical failure of the multi-piece assembly during installation or use.

On the Examiner's rejection of Claims 15 and 16 under 35 USC 103(a) over Daftary '372 in view of Daftary (USPN 5,362,235):
Arguments describing the significant structural and functional differences between applicant's submission and Daftary '372 have been discussed above.

Daftary'235 states,
"Referring to FIG. 23, there is shown a cross-sectional view of the present invention anatomical restoration dental implant system showing the angled abutment member 404 mounted on a healing cap 408, which is in turn mounted on the dental implant fixture 106, for supporting a tooth analogue (not shown). Implant fixture 106 is implanted in the patient's jaw bone 104, which is surrounded by gingival tissues 108. "

"Healing cap 408 is secured by the bolt member 406. It is noted that bolt member 406 can have an interlocked relationship before bolt member 406 is fully threaded into the implant 106. However, once bolt member 406 is fully threaded into the implant 106 as shown in FIG. 24, it is no longer engaged in any interlocked relationship with the healing cap 408, therefore allowing the angle of the healing cap to be adjusted to the best suitable position."

"Angled abutment member 404 is mounted on the head segment 452 of the bolt member 406, and secured thereon by screw member 402. The widened head segment 412 of the screw member 402 is concealed within the widened cylindrical distal section 442 of the interior bore 440 of the angled abutment member 404."

In Daftary '235 Fig. 23 teaches an angled abutment 404 with a separate mounting screw member 402 that threads within the hexagonal head of the mounting bolt 406 which, in turn, mounts within a deep hollow blind hole in implant 106 buried within bone 104. A separate interlocking healing cap 408 is included in the assembly. The threaded portion of the mounting bolt 406 deep within implant 106 compromises the mechanical strength of applicant's solid cross-section minipin implant fixture. If the elements taught in Daftary '235 were used within a minipin of 2 mm diameter, a guarantee against frank failure could not be offered. Applicant uses two fewer elements to prevent structural failure. Daftary '235 teaches significant structural differences from those of applicant.

The practitioner notes that rejections based on obviousness require both references to cite distinctly significant structural similarities to separate elements claimed by the applicant, which, in combination, would be obvious to one skilled in the art. If the central feature, a solid core, minipin implant is not present, by design or accident in either reference, then the element described in the subsidiary reference is insufficient to reject applicant's claims.

Additions to claims are underlined and deletions are struck through.

To add clarity, applicant wishes to modify his claims to include the following changes:

I claim:

1. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus to secure a prosthesis comprising a minipin implant having a solid threaded shaft with a flared transition to a hemispherical head;

said hemispherical head having an upper circular face with a central threaded blind hole limited in depth to within said hemispherical head;

a detachable abutment having a lower circular face having a projecting abutment threaded screw shaft, said abutment threaded screw shaft mating with said threaded blind hole in said implant hemispherical head to form an anchor for an overlying prosthesis.

2. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus, as recited in claim 1, comprising a minipin implant having a threaded shaft with a flared transition to a hemispherical head;

said hemispherical head having a circular face with a central threaded blind hole limited in depth to within said hemispherical head;

a detachable hemispherical abutment having a circular face having a projecting abutment threaded screw shaft, said abutment threaded screw shaft mating with said threaded blind hole in said minipin dental implant hemispherical head to form a spherical ball head to form ~~an~~ a snap-in anchor for an overlying prosthesis.

3. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus, as recited in claim 1, comprising a minipin implant having a solid threaded shaft with a flared transition to a hemispherical head;

said hemispherical head having a circular flat face with a central threaded blind hole limited in depth to within said hemispherical head ;

a detachable conical abutment having a circular face having a projecting abutment threaded shaft, said abutment threaded shaft mating with said threaded blind hole to form a truncated cone head.

4. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising a number of detents located in the surface of said hemispherical head of said minipin implant to accommodate a driving and holding wrench.

5. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising a self-starting thread on said threaded shaft of said minipin implant.

6. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising said detachable hemispherical abutment having an elongated cylindrical extension region to accommodate differing tissue and bone depths.

7. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising said detachable truncated conic abutment having an elongated cylindrical extension region to accommodate differing tissue and bone depths.

8. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising said detachable hemispherical abutment having an elongated cylindrical region having an o-ring retention groove.

9. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising said detachable truncated conic abutment having a hydrostatic relief groove with a substantially flat floor to relieve pressure while cementing prosthesis in place and to provide a window for applying a prying force to remove said prostheses.

10. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising said minipin implant and said detachable abutment with locking thread means.

11. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus as recited in claim 1, comprising said detachable abutment with a driving recess for mating said projecting abutment threaded shaft with said minipin implant said threaded blind hole.

12. (Amended) A ~~minipin~~ dental ~~implant~~ apparatus comprising a minipin dental implant having a solid threaded shaft with a flared transition to a prolate spheroidal head;

said prolate spheroidal head having a circumferential groove to catch and mate with a flexible lip to form an anchor for an overlying prosthesis.

13. (Original) A minipin dental implant as recited in claim 12, comprising flats in the surface of said prolate spheroidal head for a driving and holding wrench.

14. (Original) A minipin dental implant as recited in claim 12, comprising a shaped recess in the distal end of said prolate spheroidal head for a driving or holding wrench.

15. (Original) A minipin dental implant as recited in claim 1, comprising an offset detachable abutment.

16. (Original) A minipin dental implant as recited in claim 12, comprising an offset detachable abutment.

A clean set of amended claims are attached.

A fee for a thirty day extension of time is included.

Respectfully submitted.

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